DOCUMENT RESUME

ED 063 976 PS 005 693

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TITLE	An Intercultural Study of the Development of a Reading Readiness Skill.
INSTITUTION	California Univ., Los Angeles. Early Childhood Research Center.
SPONS AGENCY	Office of Economic Opportunity, Washington, D.C.
PUB DATE	71
NOTE	20p.
EDRS PRICE	MF-$0.65 HC-$3.29
DESCRIPTORS	Character Recognition; Child Development; Chinese; *Cognitive Development; English; Hindi; Middle Class; *Native Speakers; Perception; *Preschool Children; *Reading Readiness; Response Mode; *Second Language Learning; Testing; Visual Aids; Word Recognition; Written Language
IDENTIFIERS	Formosa; India; United States

ABSTRACT

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ED 063976

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AN INTERCULTURAL STUDY OF THE DEVELOPMENT OF A READING READINESS SKILL

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The work reported herein was supported in part by the Early Childhood Research Center, Dr. Carolyn Stern, Director. This center is funded by Grant CG9938 from the Office of Economic Opportunity.

1971

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How soon does a child learn to discriminate orthographic units in his written language as distinguished from a general form-discrimination ability. A discrimination test of letters, words, or characters, in three written languages, Chinese, Hindi, and English, at three age levels, from four to five and a half years was given to 153 middle class children from three different countries, Formosa, India, and the United States. The predicted interaction between nationality and language subtests was significant only at the oldest level, from five to five and a half years. At this age, children in each country performed relatively better on the subtest in their native language than they did in the other two languages. No sex differences were obtained.

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Introduction

The presence of the printed language in a young child's environment undoubtedly contributes to the development of reading ability. If youngsters are surrounded by reading materials, it is likely that they learn to discriminate letters and words even before they begin formal instruction in school. True, the effect of such materials may be mediated by other persons in their world; a home in which many printed materials are present is also likely to be a source of models and informal instruction. Conversely, if there are limited written materials in their environment, children have less exposure to the written language and receive less social influence in this area. The problem posed in this study was to assess the effect, prior to any formal reading instruction in school, of this informal experience with the printed word on the young child's growing ability to discriminate among the different letters and words of his native language.

There is considerable evidence that form discrimination ability continues to improve throughout the period of early childhood. Studies using the Marian Frostig Development Test of Visual Perception (1964) have revealed considerable improvement between the ages of three and six in a discrimination task such as form constancy. Elkind, Koegler, and Go (1964) found that children from four to nine years old showed an increase in their ability to perceive parts and wholes of drawings with independent meanings;

at the age of four, parts were perceived more clearly than wholes. Gibson, Gibson, Pick, and Osser (1962) found that children's discrimination of letter-like forms improve consistently from the ages of four to eight. They found the greatest changes during this age year span occurred in the ability to perceive rotation or reversal of forms.

Furthermore, there is a relationship between scores on form discrimination measures and socioeconomic status. For example, on a set of tests specifically designed to study form-discrimination abilities, Stern and Lombard (1968) found that the children from the lower class at the age of four and five do more poorly than the children from the upper middle class. If lower class children have fewer printed materials in their homes than do middle class, the deficiency in such discrimination abilities might well be related to this deprivation. Since a variety of other factors are also involved, however, it is difficult to support this conclusion on the basis of such data alone.

Systematic instruction can certainly improve the familiarity of the young child with the written elements of his own native language prior to instruction in reading. Among the results of many intervention studies is the recent finding that the television program, Sesame Street, is effective in teaching young preschool children to identify letters; the more children watch the greater is the impact (Ball & Bogatz, 1970). The effect was found even with many three-year-old youngsters.

In order to assess the informal effects of the presence of the written language in the child's environment, some deprivation technique, with adequate control of other variables, seems essential. It would be impossible to deliberately remove all contact of the subjects with the printed word.

However, although even the youngest children in practically all cultures are exposed to the written language, they usually have little contact with the written form of languages other than their own. Consequently, an intercultural design offers a promising substitute for some form of written language deprivation.

By employing a comparative approach one may use subjects from different cultures as their own controls. Children who grow up in the United States, for example, may show improvement from one year to the next in their ability to discriminate linguistic symbols; but if the language environment is a major factor, their progress should be much greater in English orthography than in their ability to discriminate Chinese characters; the opposite should be true for children raised in a word where Chinese printing abounds to the exclusion of English.

In the present study, children from Formosa, India, and the United States were tested with respect to their ability to discriminate orthographic units in their native language as well as in the other two foreign languages with which they probably had little contact. This design offers an opportunity to compare children's performances on the languages to which they are and are not exposed. If exposure is important, children in each country should do relatively better on their native language. How soon can such effects of informal exposure be expected to occur? The present investigation included children at three age levels: 4, 4 1/2, and 5 years. Children over 5 1/2 years were not included since formal instruction becomes more likely after this age.

It may be argued that the experience with the writing of only one language generalizes easily to others; hence, children who see writing

in their native tongue develop a broad ability to discriminate among orthographic units in all languages. This seems somewhat doubtful in the light of research evidence; the effect of training in form discrimination seems to be highly specific. For example, Muehl (1960) found that kindergarten children who received pretraining in matching words learned to read these words significantly better than children who were pretrained to match either different words or geometric forms. Staats, Staats, and Schutz (1962) found that the effect of pretraining experience in matching words was of value subsequently in learning to read these same words but not in matching the letters in the words. Since such experimental investigations were of relatively short duration, the treatment lasting at best only a few days, it would be injudicious to conclude that exposure to the orthography of one language over a period of years would not influence the ability to discriminate letters or characters in another language. However, there should still be far greater improvement in form-discrimination ability in the orthography of the child's native language in comparison with others.

The central question posed in the investigation was, therefore: "At what age, prior to formal reading instruction, do children in a country begin to discriminate the orthographic units (letters, words, or characters) of their own language relatively better than they do units of other languages?" The concern was not with whether children in one country performed better than children in another. Consequently, no effort was made to obtain representative samples.

For each of the three ages, the hypothesis to be tested was that children perform better, relative to the other national groups, on a test using the graphemes of their own culture than they do on language symbols

of other cultures. For each age group, the reliability of the finding was tested by obtaining the significance of the interaction between nationality and language. A subsidiary question posed in the study was the extent to which sex differences were found within each culture on each or all of the tests.

METHOD

Subjects

A total of 153 children (76 boys and 77 girls) between 4 and 5 1/2 years of age were tested in three cities: Taipei, Formosa; Delhi, India; and Los Angeles, United States. The corresponding languages were Chinese, Hindi, and English. In each country there were 17 children in each of the three age groups: 4 to 4 1/2 years, 4 1/2 to 5 years, and 5 to 5 1/2 years. All children attended schools in middle class neighborhoods located in the suburbs of one of these three metropolitan areas. In both India and Formosa, all three age groups were drawn from private nursery schools because formal schooling in these areas did not begin until after the age of 5 1/2 years. In the United States, the two younger groups were enrolled in a private nursery school while the oldest group included kindergarten children from a public school located in a middle class neighborhood.

It can be safely assumed that all these children were unfamiliar with the orthography of at least one of the foreign languages. The children in Los Angeles unquestionably had little opportunity to observe either written Hindi or Chinese. In Taipei, the youngsters may have seen some printed English but they doubtless had no opportunities to see Hindi while the opposite was true of the children in Delhi who may have encountered English but probably no Chinese.

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Attempts were made to discover how much instruction in orthographic discriminations our subjects had encountered in school. In each of the classes from which subjects were drawn, the teacher was asked whether the pupils had been given instruction in naming or matching letters or characters, in writing letters, or in other reading readiness activities. All reports were negative even from the Los Angeles kindergarten teacher. However, it seems plausible that, although formal instruction appears not to have been carried on, informal activities in letter recognition and production had occurred; for example, in the Los Angeles classes, many children wrote their names on their art work in school. Furthermore, it seems highly probable that many of the children in each country received considerable encouragement and direction in pre-reading and writing activities in the home. It may be assumed that for many of the children exposure to the written language was more than simply an incidental experience; approval for and guidance in learning such discriminations in the native language came from many sources.

Procedure

In preparing an instrument to assess the ability to discriminate orthographic units in different languages, it was decided to use a matching-to-sample format. On each item in the test, the child's task was to point to the one of three pictures (letters, words, or characters), arranged along the bottom of a card, which was like the one at the top. This arrangement was simple and, with an appropriate pre-training experience, was understood by young children.

The initial draft of the test was first tried out in English with a few American children. When the test seemed ready, the instructions were translated into Chinese and Hindi and tried out with small samples of children

whose parents were foreign students at UCLA from Formosa and India. Further modifications were based on such pilot testing. The final test consisted of 66 items, each item being displayed on a separate plastic laminated card, five by eight inches, held together in the same order by large rings.

For the actual study, the subjects in India and Formosa were tested in their own language by a resident native speaker known personally by the junior author from that country. The test administrators abroad were both women college graduates each of whom had been a nursery school teacher for some time. The test in the United States was administered by a high school graduate, with considerable experience with young children, who was trained and supervised in the test administration by the senior author. The test in each country was administered on an individual basis and took about 10 minutes.

The first sixteen items of the test were used as a short program to teach the child the task of matching to sample. On the first item, for example, the child was shown only one picture, a cat at the bottom of the card, and was asked to point to the cat. On the next three pictures, the child pointed to the cat in different positions at the bottom with one, then two, distracting pictures being added to make the three choices. In Item 5, three pictures appeared on the bottom of the 5 x 8 card. The tester showed the sample picture to be matched on a small separate card. By moving this small card appropriately, the child was prompted to point to the corresponding choice on the large card. On each of the succeeding five items, the small card showing the sample was held more closely to the top of the 5 x 8 card. The first true matching-to-sample item, without the small card, appeared in Item 11 with a sample picture at the top and three

choices beneath it. Further practice at picture matching was provided through Item 16.

Each of the first 13 items was shown to the child with directions spoken aloud in the native tongue. These directions (along with special instructions to the test administrator) were written, in the suitable language, on the back of the cards so that the tester could easily read the appropriate words as the child looked at the front of the card. In the English version, only two items had directions longer than eight words. These directions were gradually reduced in length so that there were only three words with Item 13. The rest of the 66-item test was given without verbal directions. At irregular intervals throughout the test, four humorous picture-matching items were given so as to maintain interest and attention. The last two items in the test were also easy picture-matching items to provide a "success" experience for the child at the end of the session.

The test proper consisted of 45 items, 15 items for English letters and words, 15 items for Hindu letters and words, and 15 items for Chinese characters. However, the 45 items occurred in random order without regard to language. They were arranged roughly in terms of difficulty level so that the easier items appeared first. Since the Hindi and Chinese writing had to be drawn by hand, the items in English were hand written manuscript. The 15 English letters and words to be matched were: w, b, n, u, us, me, it, to, are, Bob, Tom, Pat, look, lamb, name. The Hindi and Chinese items were selected to show a comparable range of orthographic complexity and meaning. Three scores, one for each language subtest of 15 items, were obtained for each child. Each score represented the total number of errors and non-responses.

Results

In Table 1 are presented the mean error scores and the standard deviations for each nationality on each of the three language subtests and totals, as well as the corresponding figures for all nationalities together. It is of interest to note that each of the three different language tests, for all ages and nationalities combined, yielded mean error scores approximately half-way between a perfect score of 0 and a chance score of 10; the subtests for Hindi, Chinese, and English show means for all subjects combined of 5.1, 5.8, and 5.6, respectively. For the purposes of this investigation, such an index is ideal because differences are best revealed with test items showing an average difficulty of about 50%.

Insert Table 1 about here

The Formosan children received the highest scores of any nationality group, with the American and Hindi children following in that order. $F(2,144) = 50.6$, $p < .01$. Apart from the non-representative samples, some of the nationality differences were probably attributable to variations in the translation of instructions and in the way in which the tests were administered by the examiners in the different countries.

In Table 2 are presented the results for each age group. There is a clear improvement on each of the subtests from one age level to the next, $F(2,144) = 2.78$. Comparable age trends were found within each nationality, the only exception being that the sample of 4 1/2-year-old Formosan children performed slightly better than their 5 year old counterparts.

Insert Table 2 about here

Turning to the major hypothesis for the study, the second-order interaction between nationality and subtests was significant, $F(4, 288) = 11.6$,

$p < .01$. Since the triple interaction including age was significant, $F\ (8,288) = 2.8$, $p < .01$, it appears that the effects were greater at some ages than at others. Consequently a separate analysis was carried out at each age level.

To facilitate an understanding of these interactions, the means on each subtest for the three nationalities are presented graphically in Figure 1 for each group separately. Here it may be noted that at the age of 4 to 4 1/2, the youngest level, there was no apparent tendency for the children to do relatively better on the discriminations involving the orthography of their native language. At the age of 4 1/2 to 5, the same lack of evidence is present, the only exception being that the Indian children appeared to do somewhat better on the Hindi subtest relative to their performance on the other languages. The analysis of variance for each of these two younger levels showed no significant interactions between nationality and subtest.

It was not until the age of 5 to 5 1/2 that each nationality group showed its best relative performance on the test in the native language. Furthermore, for this age group, the best score on each language was made by the children of the corresponding nationality. A separate analysis of variance for this age level showed, in addition to significant main effects, that the critical interaction between tests and nationality was reliable, $F\ (4, 96) = 11.60$, $p < .01$. The major hypothesis of the study was therefore supported only at the 5-year level.

To determine whether there were any important sex differences on these three tests, a separate analysis was carried out for all ages combined since there were relatively few boys and girls of each nationality at each age level. Results showed that neither the main effect of sex nor

interactions involving sex were significant. Since no prior hypothesis about sex differences had been formulated for any particular nationality, it would be inappropriate to look at individual groups. However, it might be observed that of the nine possible sources of sex difference, one for each of the three subtests for each nationality group, only one was significant at the .05 level: the 21 Formosan girls did significantly better on the Chinese subtest than the 30 Formosan boys.

Discussion and Conclusions

If exposure to the written language of the culture has any effect, one would expect the impact to be greater on the young child's competency with native languages to which he has been exposed than with foreign languages not likely to be seen. In this study, the performance of children from 4 to 5 1/2 years of age in three different countries demonstrated that it is not until age five that children begin to discriminate the writing elements in their native language relatively better than they do those of other languages. Furthermore, it was only at this age that the best performance on each test of such discrimination was made by children of the corresponding language community. While 4 1/2 year-old Indian children did seem to do relatively better on the Hindi test, the interaction between nationality and language for all subjects of this age, as well as at four, was not reliable. Consequently, the study lends no support to the position that, prior to age five, children on the average become relatively more familiar with the orthographic units in their own language than those of foreign languages.

There is improvement from one half-year level to the next in the children's ability to discriminate the letters of their native language,

but such a gain is accompanied by a parallel improvement in their abilities to make discriminations in other languages as well. This general growth of all children with all languages is undoubtedly the result of both maturation and learning brought about by experiences with shapes and visual patterns in the environment. The design of the present study did not permit the assessment of the effect of exposure to the written language upon this general discrimination ability.

While no reliable evidence of general sex difference was obtained, the isolated finding that in Formosa girls obtained higher scores on the native language than boys was of interest to the junior author from that country. She pointed out that in Formosa, even at an early age, girls are encouraged in linguistic and literary activities while boys are permitted to spend far more time in outdoor pursuits. There is considerable evidence that, in the United States, four-year-old children, regardless of sex, if given appropriate instruction will learn to identify English letters. The prevalence of educational programs like Sesame Street may cause such specific discrimination skills to emerge at an earlier age.

If the five year old's competence in dealing with the written language were the result of simple exposure alone, one might conjecture that these findings may be added to the evidence that children are "naturally" ready for more formal instruction at this age (cf. White, 1965). It is likely, however, that, even though no formal instruction was apparently offered by the schools, the specific competencies in the native language are facilitated in all three countries through considerable encouragement and informal guidance in both school and home. Many adults in the kind of homes from which these children came, probably taking their cue from the child's growing attention to the written language, are likely to begin teaching

children to identify letters, words, or characters of their native tongue. If children from poorer homes with less well educated parents had been tested, it is possible that partly because of less instruction these specific discrimination abilities in the native language would not have developed until an even later age.

This intercultural study was admittedly lacking in information about other factors which influence acquisition of letter discrimination skills. Nevertheless, it does distinguish between a general form discrimination ability and a specific ability to deal with orthographic elements in the native written language. The use of intercultural designs may thus offer a method which contributes to the evaluation of early instruction in "reading readiness".

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FOOTNOTES

[1]The two junior authors participated in this study while they were graduate students at UCLA. They were particularly responsible for the preparation of the test in Chinese and Hindi respectively.

[2]The data were collected before "Sesame Street" was broadcast on the West Coast.

TABLE 1

Mean Error Scores and S.D.'s for Each Nationality

on Each of Three Language Sub-Tests

Nationality of Group	N	Sub-Test Scores						Totals	
		Hindi		Chinese		English			
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Indian	51	5.5	2.6	7.5	1.8	7.5	2.6	20.4	5.7
Formosan	51	4.1	1.8	3.9	1.7	3.8	1.7	11.8	3.9
American	51	5.6	2.2	5.9	2.1	5.4	2.6	16.9	5.7
All Nationalities	153	5.1	2.3	5.8	2.4	5.6	2.8	16.4	6.2

TABLE 2

Mean Error Scores and S.D.'s for Each Age Group

by Nationality and Language Sub-Tests*

Nationality of Groups	Language Sub-Tests	Age Group					
		4-4 1/2		4 1/2-5		5-5 1/2	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
Indian	Hindi	7.4	1.9	5.5	2.3	3.4	2.0
	Chinese	7.8	1.3	7.6	2.1	7.3	1.9
	English	9.4	1.5	7.2	2.4	5.9	2.5
	Total All Tests	24.6	2.9	20.1	5.5	16.6	4.7
Formosan	Hindi	4.7	1.7	3.7	1.7	3.8	1.8
	Chinese	4.5	2.0	3.9	1.4	3.4	1.5
	English	4.7	1.9	3.1	1.3	3.8	1.4
	Total All Tests	13.9	4.0	10.6	3.3	11.0	3.0
American	Hindi	6.7	1.5	6.1	2.2	4.2	2.2
	Chinese	6.7	1.9	6.4	2.0	4.6	1.7
	English	7.1	2.2	6.0	2.0	3.0	1.7
	Total All Tests	20.5	4.1	18.5	4.5	11.8	3.2
All Nationalities	Hindi	6.3	2.0	5.1	2.3	3.8	2.0
	Chinese	6.3	2.2	5.9	2.4	5.1	2.4
	English	7.1	2.7	5.4	2.5	4.2	2.2
	Total All Tests	19.6	5.9	16.4	6.3	13.1	4.7

*For each age group there are 17 children per nationality, 51 children for all nationalities combined.

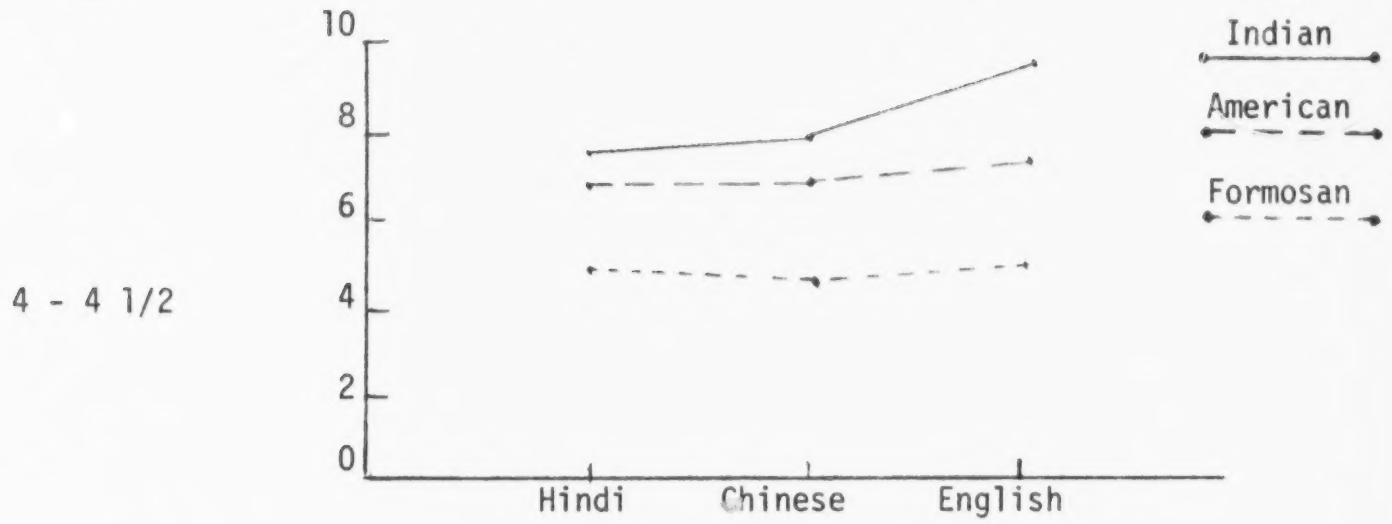

Figure 1. Mean error scores for each age group and for each nationality on each of the subtests, based on 17 children per group.